

CLAIMS:

1. A motion estimation unit for estimating a motion vector for a group of pixels of an image of a series of images, comprising:

- generating means for generating a set of motion vector candidates for the group of pixels;
- 5 - matching means for calculating match errors for the respective motion vector candidates of the set;
- selecting means for selecting a first one of the motion vector candidates as the motion vector for the group of pixels, on basis of the match errors; and
- testing means for testing whether the group of pixels has to be split into sub-10 groups of pixels for which respective further motion vectors have to be estimated, similar to estimating the motion vector for the group of pixels, the testing being based on a measure related to a particular motion vector of the series of images.

2. A motion estimation unit as claimed in claim 1, characterized in that the 15 particular motion vector is the first one of the motion vector candidates.

3. A motion estimation unit as claimed in claim 1, characterized in that the group of pixels corresponds to a block of pixels and that the sub-groups of pixels corresponds to respective sub-blocks of pixels.

20 4. A motion estimation unit as claimed in claim 3, characterized in that the testing means are designed to test whether a first one of the sub-blocks of pixels has to be split into further sub-blocks of pixels for which respective other motion vectors have to be estimated, similar to the motion vector being estimated for the block of pixels.

25 5. A motion estimation unit as claimed in claim 3, characterized in that the matching means are arranged to calculate the match error of the motion vector which corresponds to a sum of absolute differences between values of pixels of the block of pixels

and respective further values of pixels of a further block of pixels of another image of the series of images.

6. A motion estimation unit as claimed in claim 3, characterized in that the
5 measure related to the particular motion vector is based on a difference between the motion vector and a neighbor motion vector being estimated for a neighbor block of pixels in the neighborhood of the block of pixels.

7. A motion estimation unit as claimed in claim 3, characterized in that the
10 measure related to the particular motion vector is based on a difference between a first intermediate result of calculating the match error and a second intermediate result of calculating the match error, the first intermediate result corresponding to a first portion of the block of pixels and the second intermediate result corresponding to a second portion of the block of pixels.

15 8. A motion estimation unit as claimed in claim 3, characterized in that the testing means are designed to test whether the block of pixels has to be split into the sub-groups of pixels, on basis of a dimension of the block of pixels.

20 9. A motion estimation unit as claimed in claim 3, characterized in comprising a merging unit (218) for merging a set of sub-blocks of pixels into a merged block of pixels and for assigning a new motion vector to the merged block of pixels, by selecting a first one of the further motion vectors corresponding to the sub-blocks of the set of sub-blocks.

25 10. A motion estimation unit as claimed in claim 3, characterized in comprising an occlusion detector for controlling the testing means.

11. A motion estimation unit as claimed in claim 3, characterized in the being arranged to calculate normalized match errors.

30 12. An image processing apparatus comprising:
- receiving means for receiving a signal representing a series of images to be processed;

- a motion estimation unit for estimating a motion vector for a group of pixels of an image of the series of images, comprising:

* generating means for generating a set of motion vector candidates for the group of pixels;

5 * matching means for calculating match errors for the respective motion vector candidates of the set;

* selecting means for selecting a first one of the motion vector candidates as the motion vector for the group of pixels, on basis of the match errors; and

10 * testing means for testing whether the group of pixels has to be split into sub-groups of pixels for which respective further motion vectors have to be estimated, similar to estimating the motion vector for the group of pixels, the testing being based on a measure related to a particular motion vector of the series of images; and

- a motion compensated image processing unit for processing the series of images, which is controlled by the motion estimation unit.

15

13. An image processing apparatus as claimed in claim 12, characterized in that the motion compensated image processing unit is designed to perform video compression.

20

14. An image processing apparatus as claimed in claim 12, characterized in that the motion compensated image processing unit is designed to reduce noise in the series of images.

25

15. An image processing apparatus as claimed in claim 12, characterized in that the motion compensated image processing unit is designed to de-interlace the series of images.

16. An image processing apparatus as claimed in claim 12, characterized in that the motion compensated image processing unit is designed to perform an up-conversion.

30

17. A method of estimating a motion vector for a group of pixels of an image of a series of images, comprising:

- generating a set of motion vector candidates for the group of pixels;

- calculating match errors for the respective motion vector candidates of the set;

- selecting a first one of the motion vector candidates as the motion vector for the group of pixels, on basis of the match errors; and

5 - testing whether the group of pixels has to be split into sub-groups of pixels for which respective further motion vectors have to be estimated, similar to estimating the motion vector for the group of pixels, the testing being based on a measure related to a particular motion vector of the series of images.